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10. CONSUMER PRODUCTS

10.1 BACKGROUND

Consumer products may contain toxic or potentially toxic chemical constituents to which children may be exposed as a result of their use. For example, methylene chloride and other solvents and carriers are common in consumer products and may have health concerns. Potential pathways of exposure to consumer products or chemicals released from consumer products during use can occur via ingestion, inhalation, and dermal contact.

This chapter presents information on the amount of product used, frequency of use, and duration of use for various consumer products typically found in households. There are limited data available on consumer product use for the general population and especially for children. Children can be in environments where household consumer products (Table 10-1) such as cleaners, solvents, and paints are used. As such, children can be passively exposed to chemicals in these products. The studies presented in the following sections represent readily available surveys for which data were collected on the frequency and duration of use and amount of use of cleaning products, painting products, household solvent products, cosmetic and other personal care products, household equipment, pesticides, and tobacco. The reader is referred to the *Exposure Factors Handbook* (U.S. EPA, 1997) for a more detailed presentation for use of consumer products for the general population.

10.2 CONSUMER PRODUCTS USE STUDIES

Tsang and Klepeis (1996) - National Human Activity Pattern Survey (NHAPS) - The U.S. EPA collected information for the general population on the duration and frequency of selected activities and the time spent in selected microenvironments via 24-hour diaries. Over 9000 individuals from all age groups in 48 contiguous states participated in NHAPS. The survey was conducted between October 1992 and September 1994. Individuals were interviewed to categorize their 24-hour routines (diaries) and/or answer follow-up exposure questions that were related to exposure events. Data were collected based on selected socioeconomic (gender, age, race, education, etc.) and geographic (census region, state, etc.) factors and time/season (day of week, month) (Tsang and Klepeis, 1996). Data were collected for a maximum of 82 possible microenvironments and 91 different activities (Tsang and Klepeis, 1996).

As part of the survey, data were also collected on duration and frequency of use of selected consumer products. These data are presented in Tables 10-2 through 10-6 for age groups 1-4, 5-11, and 12-17 years. Distribution data are presented for selected percentiles (where possible). Other data are presented in ranges of time spent in an activity (e.g., working with or near a product being used) or ranges for the number of times an activity involving a consumer product was performed.

The advantages of NHAPS is that the data were collected for a large number of individuals, representative of the U.S. general population. However, means cannot be calculated for consumers who spent more than 60 or 120 minutes (depending on the activity) in an activity using a consumer product. Therefore, a good estimate of the high consumer activities cannot be captured.

10.3 RECOMMENDATIONS

Due to the large range and variation among consumer products and their exposure pathways, it is not feasible to specify recommended exposure values as had been done in other chapters of this handbook. The user is referred to the contents and references in Chapter 16 of the *Exposure Factors Handbook* to derive appropriate exposure factors and review its associated recommendations.

10.4 REFERENCES FOR CHAPTER 10

- Tsang, A.M.; Klepeis, N.E. (1996) Results tables from a detailed analysis of the National Human Activity Pattern Survey (NHAPS) response. Draft Report prepared for the U.S. Environmental Protection Agency by Lockheed Martin, Contract No. 68-W6-001, Delivery Order No. 13.
- U.S. EPA (1987) Methods for assessing exposure to chemical substances - Volume 7 - Methods for assessing consumer exposure to chemical substances. Washington, DC: Office of Toxic Substances. EPA Report No. 560/5-85-007.

Table 10-1. Consumer Products Found in the Typical U.S. Household^a

Consumer Product Category	Consumer Product
Cosmetics Hygiene Products	Adhesive bandages Bath additives (liquid) Bath additives (powder) Cologne/perfume/aftershave Contact lens solutions Deodorant/antiperspirant (aerosol) Deodorant/antiperspirant (wax and liquid) Depilatories Facial makeup Fingernail cosmetics Hair coloring/tinting products Hair conditioning products Hairsprays (aerosol) Lip products Mouthwash/breath freshener Sanitary napkins and pads Shampoo Shaving creams (aerosols) Skin creams (non-drug) Skin oils (non-drug) Soap (toilet bar) Sunscreen/suntan products Talc/body powder (non-drug) Toothpaste Waterless skin cleaners
Household Furnishings	Carpeting Draperies/curtains Rugs (area) Shower curtains Vinyl upholstery, furniture
Garment Conditioning Products	Anti-static spray (aerosol) Leather treatment (liquid and wax) Shoe polish Spray starch (aerosol) Suede cleaner/polish (liquid and aerosol) Textile water-proofing (aerosol)
Household Maintenance Products	Adhesive (general) (liquid) Bleach (household) (liquid) Bleach (see laundry) Candles Cat box litter Charcoal briquets Charcoal lighter fluid Drain cleaner (liquid and powder) Dishwasher detergent (powder) Dishwashing liquid Fabric dye (DIY) ^b Fabric rinse/softener (liquid)

Table 10-1. Consumer Products Found in the Typical U.S. Household^a (continued)

Consumer Product Category	Consumer Product
Household Maintenance Products (continued)	Fabric rinse/softener (powder)
	Fertilizer (garden) (liquid)
	Fertilizer (garden) (powder)
	Fire extinguishers (aerosol)
	Floor polish/wax (liquid)
	Food packaging and packaged food
	Furniture polish (liquid)
	Furniture polish (aerosol)
	General cleaner/disinfectant (liquid)
	General cleaner (powder)
	General cleaner/disinfectant (aerosol and pump)
	General spot/stain remover (liquid)
	General spot/stain remover (aerosol and pump)
	Herbicide (garden-patio) (Liquid and aerosol)
	Insecticide (home and garden) (powder)
	Insecticide (home and garden) (aerosol and pump)
	Insect repellent (liquid and aerosol)
	Laundry detergent/bleach (liquid)
	Laundry detergent (powder)
	Laundry pre-wash/soak (powder)
	Laundry pre-wash/soak (liquid)
	Laundry pre-wash/soak (aerosol and pump)
	Lubricant oil (liquid)
	Lubricant (aerosol)
	Matches
	Metal polish
	Oven cleaner (aerosol)
	Pesticide (home) (solid)
	Pesticide (pet dip) (liquid)
	Pesticide (pet) (powder)
	Pesticide (pet) (aerosol)
	Pesticide (pet) (collar)
	Petroleum fuels (home) (liquid and aerosol)
	Rug cleaner/shampoo (liquid and aerosol)
	Rug deodorizer/freshener (powder)
	Room deodorizer (solid)
	Room deodorizer (aerosol)
	Scouring pad
	Toilet bowl cleaner
	Toilet bowl deodorant (solid)
	Water-treating chemicals (swimming pools)
Home Building/Improvement Products (DIY) ^b	Adhesives, specialty (liquid)
	Ceiling tile
	Caulks/sealers/fillers
	Dry wall/wall board
	Flooring (vinyl)
	House Paint (interior) (liquid)
	House Paint and Stain (exterior) (liquid)
	Insulation (solid)
	Insulation (foam)

Table 10-1. Consumer Products Found in the Typical U.S. Household^a (continued)

Consumer Product Category	Consumer Product
Home Building/Improvement Products (DIY) ^b (Continued)	Paint/varnish removers Paint thinner/brush cleaners Patching/ceiling plaster Roofing Refinishing products (polyurethane, varnishes, etc.) Spray paints (home) (aerosol) Wall paneling Wall paper Wall paper glue
Automobile-related Products	Antifreeze Car polish/wax Fuel/lubricant additives Gasoline/diesel fuel Interior upholstery/components, synthetic Motor oil Radiator flush/cleaner Automotive touch-up paint (aerosol) Windshield washer solvents
Personal Materials	Clothes/shoes Diapers/vinyl pants Jewelry Printed material (colorprint, newsprint, photographs) Sheets/towels Toys (intended to be placed in mouths)

^a A subjective listing based on consumer use profiles.

^b DIY = Do It Yourself.

Source: U.S. EPA, 1987.

Table 10-2. Number of Minutes Spent in Activities Working with or Near Household Cleaning Agents Such as Scouring Powders or Ammonia (minutes/day)

Category	Population Group	Percentiles												
		N	1	2	5	10	25	50	75	90	95	98	99	100
Age (years)	1-4	21	0	0	0	0	5	10	15	20	30	121	121	121
Age (years)	5-11	26	1	1	2	2	3	5	15	30	30	30	30	30
Age (years)	12-17	41	0	0	0	0	2	5	10	40	60	60	60	60
Age (years)	18-64	672	0	0	1	2	5	10	20	60	121	121	121	121
Age (years)	> 64	127	0	0	0	1	3	5	15	30	60	120	121	121

Note: A value of "121" for number of minutes signifies that more than 120 minutes were spent; n = doer sample size; percentiles are the percentage of doers below or equal to a given number of minutes.

Source: Tsang and Klepeis, 1996.

Table 10-3 Number of Minutes Spent Using Any Microwave Oven (minutes/day)

Category	Population Group	Percentiles												
		N	1	2	5	10	25	50	75	90	95	98	99	100
Age (years)	5-11	62	0	0	0	1	1	2	5	10	15	20	30	30
Age (years)	12-17	141	0	0	0	1	2	3	5	10	15	30	30	60
Age (years)	18-64	1686	0	0	1	2	3	5	10	15	25	45	60	121
Age (years)	> 64	375	0	0	1	2	3	5	10	20	30	60	60	70

Note: A Value of "121" for number of minutes signifies that more than 120 minutes were spent; n = doer sample size; percentiles are the percentage of doers below or equal to a given number of minutes.

Source: Tsang and Klepeis, 1996.

Table 10-4. Number of Respondents Using a Humidifier at Home

		Frequency				
	Total N	Almost Every Day	3-5 Times a Week	1-2 Times a Week	1-2 Times a Month	DK
Age (years)						
1-4	111	33	16	7	53	2
5-11	88	18	10	12	46	2
12-17	83	21	7	5	49	1

Note: DK= Don't Know; Refused = Respondent Refused to Answer; N = Number of Respondents

Source: Tsang and Klepeis, 1996.

Table 10-5. Number of Respondents Indicating that Pesticides Were Applied by the Professional at Home to Eradicate Insects, Rodents, or Other Pests at Specified Frequencies

	Total N	Number of Times Over a 6-month Period Pesticides Were Applied by Professionals					
		None	1-2	3-5	6-9	10+	DK
Age (years)							
1-4	113	60	35	11	6	1	*
5-11	150	84	37	10	18	1	*
12-17	143	90	40	5	6	*	2

Note: * = Missing Data; DK= Don't know; Refused = Respondent Refused to Answer; N = Number of Respondents
Source: Tsang and Klepeis, 1996.

Table 10-6. Number of Respondents Reporting Pesticides Applied by the Consumer at Home To Eradicate Insects, Rodents, or Other Pests at Specified Frequencies

	Total N	Number of Times Over a 6-month Period Pesticides Applied by Resident					
		None	1-2	3-5	6-9	10+	DK
Age (years)							
1-4	113	46	46	15	3	3	*
5-11	150	50	70	24	1	4	1
12-17	143	45	64	21	5	8	*

Note: * = Missing Data; DK= Don't know; Refused = Respondent Refused to Answer; N = Number of Respondents
Source: Tsang and Klepeis, 1996.